PCARA Update

Volume 17, Issue 7 Peekskill/Cortlandt Amateur Radio Association Inc. July 2016

Alight in the field

PCARA Field Day 2016 was an awesome success! We had a total of 21 people (and one feline) come out to support our efforts. We had overnight coverage, great weather; setup and teardown were accomplished in record time. An air-powered antenna launcher was used to get antennas well up into the air (thanks to Mike N2HTT). The panel truck we rented worked out great, it served both as a means to transport equipment as well as a platform from which to work (thanks Joe, WA2MCR). We made 816 QSOs despite less-than-desirable band conditions due to very quiet solar activity. Contacts were made using $LiFePO_4$ batteries charged with solar panels (thanks to Mike W2IGG and David KD2IRA). Folks showed up with coffee, food, snacks, and water. **The teamwork was just outstanding! Thanks to all** who helped to make PCARA Field Day 2016 one of the best ever!

The next big item on the radar is the 36th Annual Harry Chapin Memorial Run Against Hunger on Sunday, October 16, 2016 at Croton-Harmon High School in Croton-on-Hudson, NY. We have been invited back again this year to help provide communications support for the event. More details to follow as we get closer to the date. For more information on the Annual Harry Chapin Memorial Run Against Hunger, please visit their website at: http://www.runagainsthunger.com/. Please consider joining us this year.

Work is being carried out on the 448.725 MHz repeater. Some improvements are under way and the Yaesu System Fusion DR-1X repeater should be humming along nicely soon. When you get a chance give it a try and let us know what you think. *[See 'Late news', p 16. – Ed.]*

Here are some upcoming regional hamfests:

- Sussex County Amateur Radio Club Hamfest on Sunday July 17, 2016. For more details please see: http://www.scarcnj.org/hamfest/pdfs/SCARC-Hamfest-2016.pdf .
- Ramapo Amateur Radio Club Hamfest on Sat August 20, 2016. Visit http://www.qsl.net/rmarc/ for more information.
- Candlewood Amateur Radio Association Western Connecticut Hamfest on Sunday August 28, 2016. See http://www.cararadioclub.org/ for further details.

PCARA's Field Day stations were housed under canvas and inside this rental truck, parked at Walter Panas High School.

Please remember that our next scheduled meeting will be **Sunday September 11**, 2016 (skipping the Labor Day weekend) at 3:00 pm at New York-Presbyterian / Hudson Valley Hospital in Cortlandt Manor, NY. I look forward to seeing each of you there. Until then, have a great summer!

- 73 de Greg, KB2CQE

PCARA Officers

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Greg Appleyard, KB2CQE; kb2cqe at arrl.net
Vice President:
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Contents

Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m. Join net control Karl, N2KZ for news and neighborly information.

Adventures in DXing

-N2KZ

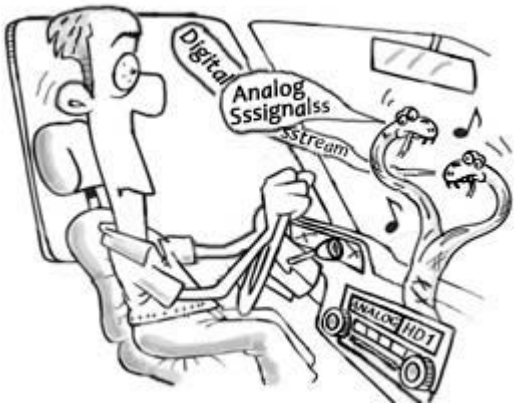
HD hiccups

HD Radio® has been alive since 2002. It took 14 years before I truly came into the fold and owned my own HD Radio receiver. Of course, I have had the experience of previously experimenting with the technology. Many of us have encountered HD Radio especially in rental cars. The pivotal questions remains: Does the system work? Does this technology add anything to modern life?

Karl's new vehicle came with a JBL entertainment system that is HD Radio-capable.

My findings are complex. As a system for conveying what we call 'radio,' in practice HD Radio ultimately fails. At least while driving, HD Radio signals are too fragile to fend off impossible amounts of interference, blocking by physical objects, adjacent and co-channel interference and all the other peril a signal can meet. It falls under that old cliché: 'When it works, it works very well, but it usually doesn't.'

One characteristic can be really disturbing. If you decide to rely on both analog and HD digital signals to hear your program, you'll find yourself listening to a confusing relay race of radio content. Regardless of which band you choose, AM or FM, the HD signal is never in perfect synchronicity with its analog companion. I often hear parts of statements being repeated or being upcut as my radio tries to decide which variety of signal to lock onto.



*HD=**Hyd**ra Radio? Listening to HD Radio's digital and analog signals 'blend' into each other can be very disturbing.*

*[**Upcut:** (verb) Chopping off the beginning of an audio or video sequence. Can occur when the technical director doesn't cut to a new audio or video source quickly enough. – Ed.]*

Why? HD Radios employ a 'bucket brigade' system that stores a brief duration of programming before playback. If the digital signal is momentarily blocked, the radio reverts to the stored material to fill the gaps. If your break in coverage exceeds the amount of data you have stored, the radio reverts back to the old-fashioned analog feed. HD and analog are nearly never in perfect sync. Switching between them can be very tiring to listen to!

It is a slightly better story when you are in a stable situation. You know what signals are viable and can choose a reliable HD station to listen to (providing, of course, that you can find one at all!) My curiosity led me on to a quest to see just what alternative programming HD Radio could provide. Standard primary programs carried by HD Radio are simply duplicates of their analog siblings. When HD Radio kicks in, you are replacing a standard low-fi analog program source with (hopefully) a superior HD digital program source, improving fidelity and spatial integrity of the stereo platform stage. Especially with AM radio, the sonic upgrade to its partner HD signal can be profound.

Screen shot of Karl's new audio system receiving WCBS-HD, as transmitted by WCBS-AM on 880 kHz.

The concept of replacing AM radio quality sometimes even involves FM-delivered HD radio. For example, if you tune to WCBS-FM on 101.1 MHz and decode their HD2 subchannel, you will hear the FM HD version of WCBS Newsradio 880. This FM-delivered rendition sounds even better than the AM-delivered HD Radio version of WCBS 880 with more overall clarity, dynamic range and a much fuller 'bottom end', making the broadcast sound almost 'tubby.' Think of the sound that emotes from a bass-enhanced boom box! Unfortunately, if you lose the signal of an FM-delivered version of an AM station you'll hear silence. HD Radios are not designed to hop from FM to

Oldies station WCBS-FM on 101.1 MHz has two additional HD Radio subchannels. The WCBS-HD2 stream carries the same programming as AM station NewsRadio 880, but with different audio quality.

AM to find an analog alternative when the signal drops. You can only tune to one frequency at a time!

Another catch: Only the FM variety of HD Radio has the capability of transmitting more than one program source. This is where things get interesting. Locally, FM-delivered HD broadcasts include as many as four discrete programs per carrier. The variety of sounds you can receive are hard to predict. There are some obvious alternatives like country, jazz, religious and classical formats. Ethnic programming is also offered. For example: On 105.1 MHz, 'Power 105' WWPR HD2 is the home of Russian-speaking *DaNu Radio* competing with *Radio Russkaya Reklama* on WWFS HD4 102.7. Compared with the thousands of audio choices streaming on the Internet, the handful of alternative offerings heard on HD Radio lose their novelty.

It is one thing to flip-flop between analog and HD Radio to establish program continuity. When you are listening to shows *only* carried by HD Radio sub-channels, especially mobile in a car, prepare for interruptions. I have tried to lock onto even strong local stations without success. With no alternative source to rely on, when you lose a signal all audio stops! End of show! (Unless the signal returns unannounced farther down the road!)

As a rule of thumb, unless you are in close proximity of a digital broadcast transmitter in an interference-free zone, HD Radio will have a difficult time resolving into perfect digital audio. Consider WCBS Newsradio 880: As an analog signal, WCBS 880 AM can be heard thousands of miles away directly with an inexpensive radio. I have enjoyed hearing them in the Caribbean, in the Midwest and nearly everywhere I go. Driving to work, I am within 20 miles of the efficient and admirable WCBS transmitter on High Island and often still can't lock their HD digital signal. Compare analog and digital coverage maps and you will see a profound difference. There has to be a better way!

'Doghouse' at WCBS-AM and WFAN-AM transmitter site combines the output from both transmitters into one antenna.

*TX site for WCBS-AM and WFAN-AM on **High Island**, NY between City Island and Pelham Bay in Long Island Sound.*

All is not lost! In time, I discovered some unobvious reasons to endear HD Radio. There is more than just audio data riding on a HD Radio transmission. My car extracts data from HD Radio broadcasts to feed traffic and weather displays. Rapidly-updated voluminous reports of every recent accident and road maintenance event appear on my dashboard screen with warning prompts. Full color wide-area weather maps and up-to-date weather reports from cities all over North America can also be seen on-screen thanks to HD Radio. Would you ever guess that these services are fed data distributed by radio broadcasts?

One must wonder if alternatives will become available to eventually replace HD Radio data. Some broadcasters have lost their enthusiasm for HD Radio technology in the past few years. A few AM HD radio encoders have left the air: WFAN 660, WOR 710 and WQEW (now WFME) 1560 now have reverted back to exclusively broadcasting analog signals. One new AM HD station has come on the air recently. WRCR 1700 from Ramapo in Rockland County now is HD Radio encoded in full high fidelity stereo.

Project Engineer Tom Ray, W2TRR adjusts the coupler for the 198 ft tower in Nanuet that transmits WRCR-HD on 1700 kHz.

I can only wonder about the

future of HD Radio. It is hard to understand the business model to support this technology. Additional audio services broadcast on FM HD subchannels nearly never generate additional revenue unless they are part of a local marketing agreement where the entire channel is rented to an outside party. AM HD merely increases fidelity of an already broadcasting analog station. No new revenue will be seen there either! iBiquity, the technology licensing company that promotes HD Radio, collects extraordinary fees from stations who agree to use HD Radio. The cost-profit analysis looks bleak!

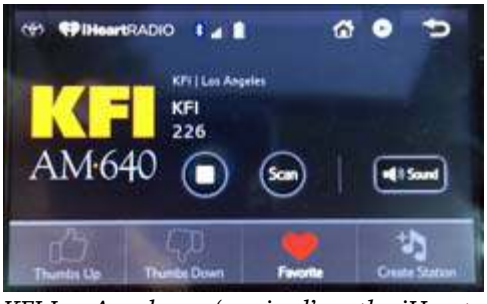
*Look for **h**ighly-in**d**ebted radio?*

More to Come!

Certainly, HD Radio is not the only alternative audio source when driving. My car is also fitted with portals to three other providers beyond AM/FM/HD and XM: iHeart, Pandora and Slacker. To hear these services, your cell phone acts as an Internet interconnect. Their servers stream audio to the Internet and your cell phone makes a wireless connection to bring their data into your car. The final few inches, between your phone and your car audio system, is via Bluetooth. Whew! I hope your audio enjoyed the trip!

iHeart Radio offers a select group of over-the-air stations (mostly owned and operated by iHeart) from around the country and additional stations from international locales like Australia, New Zealand and the Middle East. You can also listen to audio streams based on fixed formats or create your own 'stations' by entering your listening preferences and then fine tuning your playlist by 'liking' or giving songs a 'thumbs down.'

After getting over the initial kick of being able to call up stations from afar, my usage of iHeart became more utilitarian. The iHeart user interface in my car allows you to pick four favorite stations for easy recall. I chose WJR Detroit (due to my ties to Michigan,) KFI Los Angeles (so I can hear time shifted replays of the wacky and entertaining Coast to Coast AM,) and our local WNYC AM and FM so I can listen while driving out-of-town or out of range. I should also mention that iHeart only allows you to switch between your four favorites while the car is in motion. More detailed searching and experimentation must be attempted while parked. It took me a while to realize this intended limitation. I initially wrote these problems off to bad net connectivity and/or a bad interface.



KFI Los Angeles as 'received' on the iHeart option of Karl's vehicle audio system.

Slacker is a similar service providing alternative audio services (like ABC Radio News and ESPN Sports Radio) along with another music customization system to build presets based on your listening desires. Slacker's dependence on pre-recorded 'live' content dissuaded me. Hearing yesterday's news and sports really has no value to me.

Pandora was originally established as a system to audition many new musical artists and their songs using home computers. (Hopefully, you'll hear things you like, tag them and purchase them through Pandora.) It's now available in cars, too. Pandora has the deepest library of music artists, songs and genres. If you want to create a channel featuring an exotic genre like Mexican *Norteño* music, this is the place. I found Pandora to be the most satisfying service of the three. The amount of musical variety available is simply endless.

Just like old-fashioned radio, you have to remember that audio streaming services are a business. None of them will allow you to create your own playlists of precisely what you want to play and nothing else. You determine a starting point and then they take the wheel (at least figuratively!) introducing you to new artists and new songs. Many services also insist on offering a method to buy each song and some even run advertising. You can't launch and run complex audio streaming systems without a flow of revenue!

If all this variety wasn't enough, with a little more effort you can also connect to Internet distributed audio services not built into the car's interface via Bluetooth or 'auxiliary' wired connections. One particularly useful app to try is TuneIn. It is absolutely fascinating how many audio sources they offer! If you want to hear radio stations from Nepal, Mongolia, Japan or anywhere around the world, it's all there in multitudes. I personally listen to BBC Radio Scotland, NRJ and *Fréquence3* from France, shortwave favorites like Radio New Zealand and Radio Australia and many more. Just don't lose your wireless Internet connection! With TuneIn, all the world's radio is your oyster!

You'll have to excuse me. I'm going to take a long ride now so I can listen to my car radio for a while. You never know what you might hear next! Until we meet again, 73 and dit dit from N2KZ 'The Old Goat.'

Field Day 2016

Darkest just before the dawn

Planning for PCARA's 2016 Field Day effort began several months ago. After last year's sad decision to abandon Field Day 2015 because of stormy weather and competing activities, Joe WA2MCR proposed renting an **enclosed panel truck** for 2016. The truck would provide weather-proof housing for stations, and could transport bulky equipment to the Field Day site. At the April and May meetings, Joe's suggestion was approved — and so Field Day 2016 took a different turn from past years.

Field Day for 'hams'

The Peekskill/Cortlandt Amateur Radio Association's premier event of the year--"Field Day 2016"--will be taking place from 2 p.m. Saturday, June 25 through 2 p.m. Sunday, June 26 on the rear grounds of Walter Panas High School, 300 Croton Avenue, Cortlandt Manor.

Locally, Field Day is officially a 24-hour operating event for the PCARA to demonstrate the communications ability of the amateur radio community in simulated emergency situations. Anyone with an interest in amateur radio is welcome to attend, either to just watch or meet amateur radio operators from PCARA.

Often called "ham radio," the amateur radio service has been around for a century. In that time it has grown into a world-wide community of licensed operators using the airwaves with a variety of communications technology to transmit voice, data and photographs to locations, near and far, without being dependent on commercial systems, according to a press release from the National Association for Amateur Radio.

Amateur radio operators often volunteer their services for pre-planned, non-emergency events, with operators set up along various locations of routes of fund-raisers like the annual Harry Chapin Memorial Run Against Hunger each October in southern Cortlandt and Croton-on-Hudson. However, "hams" have frequently been called upon across the globe to provide communications in the wake of emergencies and disasters when emergency services and general population telecommunications systems are disrupted.

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Thanks to Henry KB2VJP, the above column appeared in Croton-on-Hudson's The Gazette *newspaper for June 23.*

At the June meeting, we heard from Henry, KB2VJP that he had submitted press releases to the *Journal News*, *Northern Westchester Examiner* and Croton-on Hudson's *The Gazette*. The first two missed their target but Henry scored a **hit** with *The Gazette*, where *Field Day for 'hams'*, appeared in the June 23 issue. The article described our hobby and PCARA's activity on June 25-26. There was even a mention of our support for the Harry Chapin 'Run Against Hunger' which takes place in Croton-on-Hudson and adjacent areas of Cortlandt. Thanks Henry!

Joe obtained the permit from Lakeland School District for operation at Walter Panas High School, while NM9J checked New York Elite Baseball's web site for possible events at the school. There was a game scheduled for Friday night, June 24 but the weekend of June 25-26 was clear. An informal meeting was held on June 21 at the Barnes and Noble café to check who was bringing what and to introduce PCARA Field Day to members who had not taken part before.

'Hams'

from page 2

According to the NAAR, across the U.S. and Canada more than 35,000 amateur radio operators are expected to gather this weekend to operate from a variety of locations, some of them remote.

Amateur radio frequencies are the last remaining place in the usable radio spectrum where an individual can develop and experiment with wireless communications, adds the association.

For additional information on the local event, contact Henry Ritz (KB2VJP) at 739-0884 or hritz104@yahoo.com or Club President Greg Appleyard (KB2CQE) at 646-4616 or Kb2cqe@arrl.net.

Continuation of The Gazette *article.*

Preparation

Friday June 24 was soon upon us. Joe collected the "Moving Truck" from U-Haul in Cortlandt Town Center and a number of members carried heavier items from Joe's garage into the wide open spaces of the truck. With everything stowed, it still did not look very full!

Mike N2HTT, David KD2IRA and Greg KB2CQE begin loading the panel truck at Joe, WA2MCR's location.

After loading was complete, Mike N2HTT took the opportunity to demonstrate his pneumatic antenna launcher, based on a *QST* article by Byron, W4SSY: "The W4SSY Spudgun", *QST*, March 2009, p 67. The launcher is fabricated from Schedule 40 PVC pipe with a hand-operated tire pump to pressurize the chamber and an electrically-controlled sprinkler valve as the release mechanism. Nylon line is paid out and wound back

Antenna launcher built by Mike N2HTT.

onto a fishing reel. The demonstration in Joe's yard looked most convincing.

Big day

Saturday June 25 dawned warm and sunny. At 9:30 a.m. Joe WA2MCR fired up the engine of the rental truck then set out for Walter Panas High School, parking close to the baseball field. We were soon joined by a good number of members who quickly unloaded the truck and began set-up of stations and antennas. The push-up tent, which would house the 'free' VHF station was erected close to the truck, alongside the baseball field's wire mesh fence. Two 6 foot tables were then set up inside the truck for the two HF stations that are allowed by Class 2A.

Joe WA2MCR parked the rental truck close to the fence at Walter Panas High School. Push-up tent for the VHF station is erected nearby by Henry KB2VJP and David KD2EVI.

Mike N2HTT assembled his antenna launcher and began sending nylon lines across the lighting poles that surround the ball field. The first few attempts were thwarted by the wind — but Mike soon had a measure of the blustery conditions and sent lines high over the lamp supports at the very top. This was a significant improvement over previous years when our fishing poles and elastic-powered launchers could only reach the lower rungs, below the lamp fittings. For the third support, Mike sent a line soaring over the trees in the nearby grove. His ¾" PVC pipe 'projectile' came sliding down through the branches without a problem.

Mike N2HTT sends a nylon line over the right-field light pole.

The 102 foot G5RV antenna was suspended south-north between the light poles at home base and right field. The multi-band dipole covering 40 – 10 meters was pulled up between the same home-base pole and the grove of trees, oriented east-west, with its central coaxial feeder descending into the panel truck. Both antennas looked highly impressive with their improved height above ground.

Multi-band dipole for 10, 15, 20 and 40 meters and part of the G5RV antenna are just visible, suspended from the top of the same light pole.

For the VHF station, Joe had brought along his 6-meter 3 element Yagi plus rotator which was mounted on an aluminum mast then pulled up against the backstop fence by a large team effort. After the VHF feeder frustrations of 2014, VSWR was very carefully checked on an MFJ antenna analyzer before the aluminum pole was finally secured with guy ropes and ties.

Left to right: Charles N2SO, Mike N2HTT, Mike W2IGG and Joe WA2MCR begin pushing up the 6 meter rotary beam.

Station set up

Some of the equipment used at PCARA Field Day may be familiar from previous events. Inside the truck, Joe WA2MCR had brought along his Icom IC-7410 HF

transceiver, which was connected to the G5RV antenna for 80 - 20 meter operation. NM9J supplied an Icom IC-706MkIIG transceiver, which worked well with the multi-band wire dipole on 40 - 10 meters. In order to reduce mutual interference, separate W3NQN bandpass filters for 80 – 10 meters were installed in the antenna lines. From time to time the wire antennas were exchanged between stations to take advantage of their different directional patterns.

Inside the truck, Charles N2SO and Joe WA2MCR operate 40 meter CW using Joe's IC-7410 transceiver. Lou KD2ITZ is visible top left, operating the IC-706MkIIG on 20 meters.

Beneath the push-up tent, the VHF station was assembled using an Icom IC-7000 transceiver from WA2MCR. This worked well on 50 MHz with the 6 meter Yagi, while a mobile antenna from David KD2IRA was used for the occasional 2 meter contact.

The VHF station was assembled under the push-up tent. Malcolm NM9J is seen passing an item over the fence to Mike N2EAB while Lou KD2ITZ prepares to log. [W2CH pic.]

In order to qualify for "100% Emergency Power" all the transceivers were powered from a Honda EU2000i generator supplied by Bob, N2CBH. Once again, this little unit purred away throughout Field Day, providing 120 volts AC while sipping just a few gallons of fuel. Nearby was an array of solar cells from Mike W2IGG and David KD2IRA, charging 12 volt lithium batteries in the bright sunlight. After charging, Mike connected batteries to the IC-7000 so it could make six "Natural Power" contacts on SSB and CW, gaining additional bonus points.

Mike W2IGG checks the state of a 12 volt lithium battery as it is being charged by nearby solar panels.

The logging software was the latest version 5.1 of N3FJP's "ARRL Field Day Contest Log". Some members have already used this package on past Field Days, but for newcomers, there is a Quick Start YouTube video available at https://youtu.be/DJEIXuoKWqc .The two HF station computers were sufficiently close to the central router for wired Ethernet connections, while the more distant VHF station relied on a wireless link to our once-a-year 'PCARA' network. NM9J had brought a separate notebook for digital modes, using W1HKJ's Fldigi software and a SignaLink USB external sound card adapter.

All three stations were ready just in time for the 2:00 p.m. EDT start on Saturday afternoon. Now it was time to see whether all our planning would pay off with smoothly-functioning equipment and plenty of contacts.

Conditions

In recent months, the sun has not been kind to amateur radio communication. Low sunspot activity means that the higher frequency HF bands are less suitable for long-distance communication. As a result much of our HF Field Day activity was on the 40 meter, 80 meter and 20 meter bands. VHF contacts were mainly 'local', but with some extension toward Vermont, Delaware and New Hampshire on Saturday afternoon. On Sunday afternoon there was a much better VHF opening, with 6-meter contacts into North Carolina, Georgia, Alabama, Florida and Missouri. This corresponded with improved conditions on 10 meters, where contacts were made in the same general direction, toward Virginia, Georgia and Florida.

Bonus points

Encouraged by Henry KB2VJP's 'Media Publicity' success, a special effort was made this year to maximize bonus points. Karl N2KZ featured Field Day activities on PCARA's Facebook page, which should attract some 'Social Media' points. Dan NT2I's son Elliot, KC2ZAB came along to operate — but Elliot is now too old for the Youth Participation bonus. Fortunately Charles N2SO brought along grandson Ethan who made several contacts under supervision and earned valuable youth points.

11-year old Ethan is supervised by Mike N2HTT (right) as he makes HF contacts for the Youth Participation bonus. Grandfather N2SO looks on from top left.

Mike N2HTT explained the design of his Arduino-based 'Digital Fist Recorder' — as featured in *QST* for November 2015, p38 — to several interested members, then programmed the unit for on-air use at the VHF station. Mike also gave instruction on the best rope knots for supporting Field Day antennas, complete with audience participation. These activities should qualify for the Educational Bonus. The W1AW Field Day bulletin was copied on Friday evening using CW and PSK31. As mentioned earlier, "Alternate Power" was used for several solar-powered contacts at the VHF station.

Operation from Walter Panas High School was from a Public Location, where members of the public come and go to use the tennis courts and other facilities. PCARA had its large vinyl sign, publicity board and 'Public Information Table' on full view with handouts available throughout the event.

Greg KB2CQE shows PCARA's coverage to Alan at the club information booth.

All these special efforts should add up to a record number of bonus points for Field Day 2016.

Tear-down

When 2:00 p.m. arrived on Sunday afternoon, the transceivers were switched off, the computers were shut down and the generator stopped. With plenty of members taking part it did not take long to pull down the antennas, dismantle the station equipment, then pack everything into the panel truck and other vehicles. Several members followed the truck back to WA2MCR's driveway to assist with unloading. As a final step, the truck's storage area was swept clean so Joe could return our means of transport and operating shelter back to the U-Haul parking lot — on-time and in pristine condition.

Thanks for your support

There was a lot of enthusiasm for PCARA's 2016 Field Day effort from new members and established veterans alike. Even during the quieter overnight hours and early on Sunday morning there always seemed to be a good number of operators willing to sit down and make contacts. All this enthusiasm extended to the set-up and tear-down periods, with many hands making light work of the mechanical and electronic tasks that are essential for Field Day. Thanks to all who came out to assist! Our sign-in sheet showed a total of 19 helpers, operators and loggers (not to mention PCARA's club mascot, Spencer the Cat at number 20).

Here is a summary of claimed points for PCARA Field Day 2016 (**bold**) along with a comparison of scores from previous years.

Peekskill/Cortlandt ARA, W2NYW, Class 2A

	2002	2003	2004	2005	2007	2008	2009	2011	2012
QSOs:	718	733	968	853	1019	1109	694	879	968
Power:	2 (<150W)								
Partcpts:	15	11	12	10	14	10	10	14	15
Tot scor:	2,096	2,328	2,996	2,798	2,906	3,460	2,746	2,602	2,920

	2013 (Class 1A)	2014	**2016**
QSOs:	775	722	**816**
Power:	2 (<150W)		
Participants:	14	16	**19**
Total score:	2040	2460	**3018**

2016 break-down by band, in order of number of QSOs:

40 meters - 337 QSOs; 80 meters - 209 QSOs
20 meters - 142 QSOs; 6 meters - 110 QSOs
10 meters - 15 QSOs; 2 meters - 3 QSOs.

Finally, we must say a big **thank you** to the following participants who signed-in at PCARA's Field Day 2016: Karl N2KZ, Bob N2CBH, Mike W2IGG, Marylyn KC2NKU, Ray W2CH, Paul N2DXL, Mike N2EAB, David KD2IRA, Joe WA2MCR, Lou KD2ITZ, Charles N2SO + Ethan, Lovji N2CKD, Daniel NT2I + Elliot KC2ZAB, Mike N2HTT, Greg KB2CQE and Henry KB2VJP.

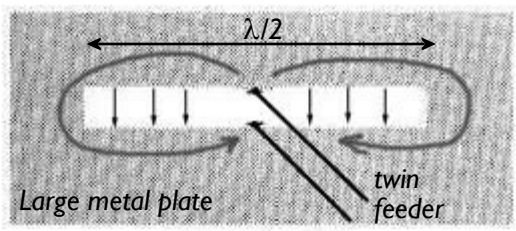
- NM9J

Lots of slots

The antenna that isn't there

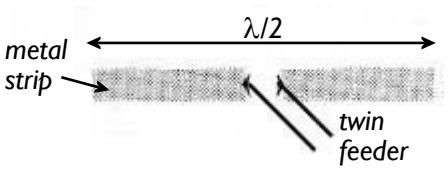
One type of antenna that receives very little mention in the Amateur Radio handbooks is the **slot antenna.**

When a narrow slot is cut in a large conducting sheet and a radio frequency field is set-up across the slot, then RF energy is radiated. For example, if a horizontal slot is cut in a large, vertical sheet of metal and opposite edges of the slot are excited by a feeder, the slot will radiate in a similar way to a dipole.



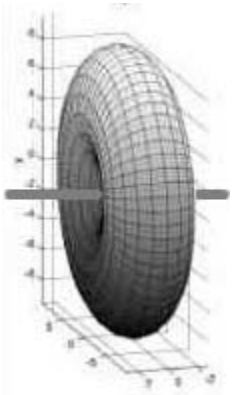
Slot antenna formed by cutting a strip of metal from a large conducting sheet. Arrows indicate the electric field across the slot and circulating currents in the sheet.

If we take the strip of metal that was cut out of the large metal sheet and connect the same feed-line in the middle, then this radiator is called the "complementary antenna". We already know what the radiation pattern looks like for this antenna. It constitutes a standard half wave dipole, with the familiar 'squashed doughnut' pattern, having equal radiation around the center of the dipole, but minimal radiation off the ends.



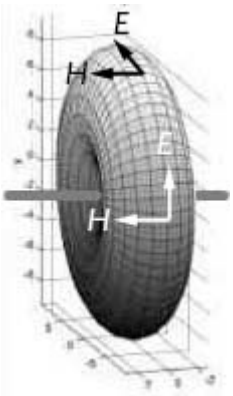
When the strip of metal removed from the slot antenna is fed in the middle, it produces the 'complementary antenna'.

The radiation pattern of a slot antenna is **identical** to its complementary antenna. But there are several important differences as listed below.



Polar diagram of λ/2 horizontal slot antenna and its complementary dipole.

1. E/H fields exchanged. The electric and magnetic fields produced by a slot antenna are interchanged when compared with its complementary antenna. For example, with a horizontal *slot* antenna, the electric field is developed across the narrow dimension of the slot so the electric field lines are vertical (in the horizontal plane) while the magnetic lines — caused by electric current circulating in the surrounding metal plate — are horizontal. With a conventional horizontal dipole, the electrical field lines are in the horizontal plane while the magnetic lines form loops in the vertical plane.



Electric (E) and magnetic (H) fields for a horizontal slot antenna cut into a vertical sheet.

2. Opposite polarization. As a result of the E/H fields being interchanged, the electromagnetic radiation from a slot antenna has opposite polarization compared to its complementary antenna — in our example, a horizontal λ/2 slot will produce **vertical polarization** in the horizontal plane through the slot.

A vertical λ/2 slot dipole in a vertical sheet would produce horizontal polarization everywhere.

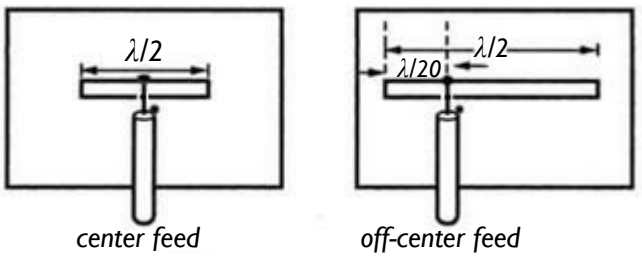
3. Different impedance. Another contrast between a slot antenna and its complementary form is that the feed-point impedance is modified for the slot. For example, if we adjust a standard half wave dipole for resonance, it will have an impedance of approximately 72 Ω. The complementary slot antenna has an impedance of approximately 500 Ω. There is an equation relating these two impedances, for free space:

$Z_s = 35476 / Z_d$

…where Z_s is the impedance of the slot antenna and Z_d is the impedance of the complementary dipole antenna.

Feeding a slot

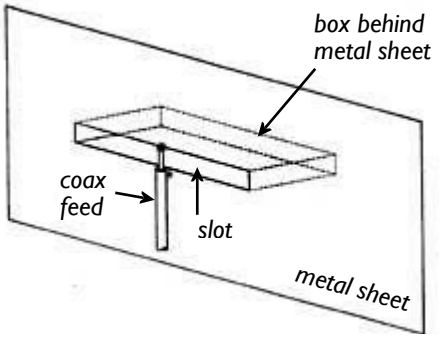
As well as using twin feeder, a slot antenna can be fed with coaxial cable, where the inner conductor is connected to one side of the slot and the outer conductor is bonded to the metal sheet on the opposite side of the slot. The 500 Ω impedance at the center of a half wave slot could cause a mismatch, so an off-center feed can be employed — a distance of approximately λ/20 from the end of the slot will match 50 Ω cable.



A *full-wave* slot will match directly to 50 Ω cable by feeding right at the center.

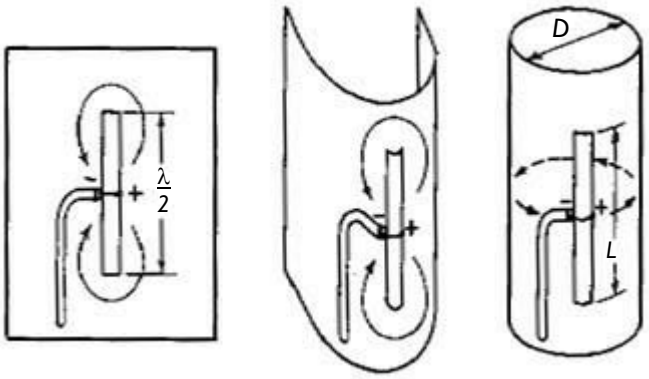
One sided slot

In the world of amateur radio, we don't often encounter large, flat sheets of metal suitable for cutting slots into — though it does happen from time-to-time. Even if we have a very large sheet of metal, we usually want the radiation to be sent out on *one side* only. In that case, a conducting box can be constructed *behind* the slot so that no energy is radiated backward.



Boxed-in slot antenna radiates on one side of the sheet only.

Another approach is to take our sheet of metal and bend it *back* on itself to form a cylinder. Or it can be folded back on itself to form a rectangular cross-section conductor. We can still cut a slot in the surface of this conductor — but the polar diagram will be different from the large conducting sheet because currents circulating around the slot can now join up in the folded part of the sheet *behind* the slot.

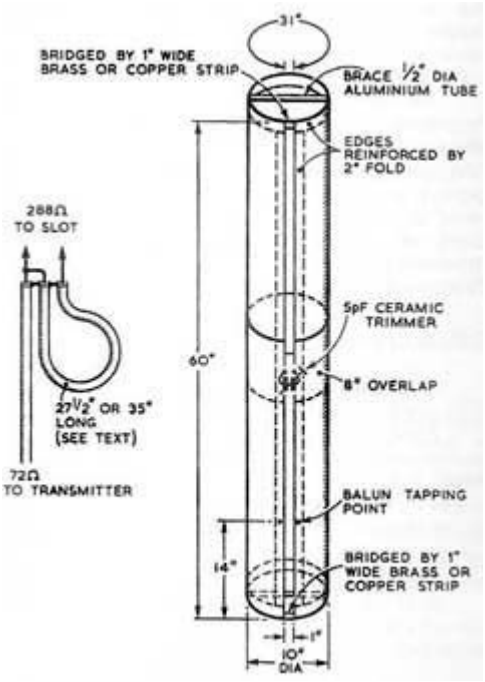


*Transformation of a vertical sheet with a slot into a slotted cylinder (after Kraus - Antennas). Once the edges meet to form the cylinder, currents can circulate **behind** the slot.*

Cylindrical slot antenna

The first slot antenna that I constructed was during my early days on the 2 meter band. Before FM became popular in the U.K., operation was mostly on *AM* with *horizontal* polarization, using antennas such as the halo and horizontal Yagi. So I needed a design that was horizontally polarized and omnidirectional. The following cylindrical slot design is from the RSGB *VHF-UHF Manual* (1972) by G.R. Jessop, G6JP.

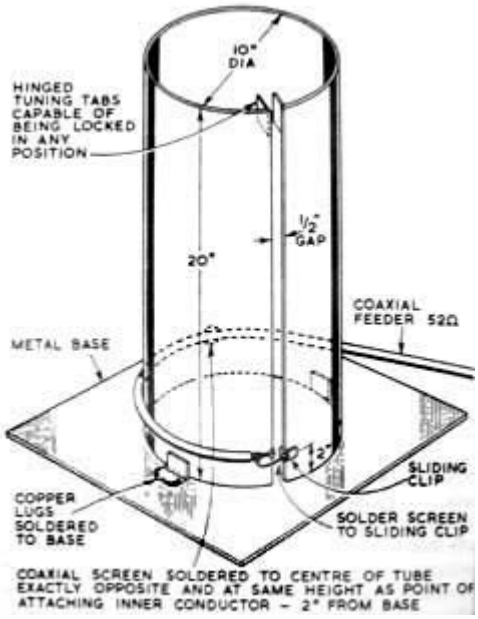
The antenna consists of a vertical cylinder, 60" tall, made by folding a sheet of copper, brass or aluminum. I fabricated my cylinder from two sheets of tin plate (tin-plated steel), purchased from the local hardware store. The vertical slot itself is 58" high and 1" across — note that this height is significantly longer than a half wave. According to *Antennas* author John Kraus, W8JK, the length of a cylindrical slot has to be *greater* than λ/2 for resonance. Typical dimensions for resonance of a slotted cylinder are a diameter of 0.125λ, slot length = **0.75** λ and slot width of about 0.02 λ.



Cylindrical slot antenna for 2 meters with suitable balun (left) as described in RSGB publications.

One advantage of using tin-plate was that it could be soldered very easily, making it simple to attach the feeder and the small adjustable capacitor for achieving resonance. The whole assembly was rather unwieldy, so I installed it in the attic — out of sight, out of mind. It looked quite impressive though!

There is a smaller version of this antenna, just 20" high, with a ½" wide slot, known as the "Abe Lincoln Antenna" because of its similarity to a stove-pipe hat. It was recommended for mobile work with horizontal polarization on 144 MHz — though it might be rather noticeable when fitted on a car roof.

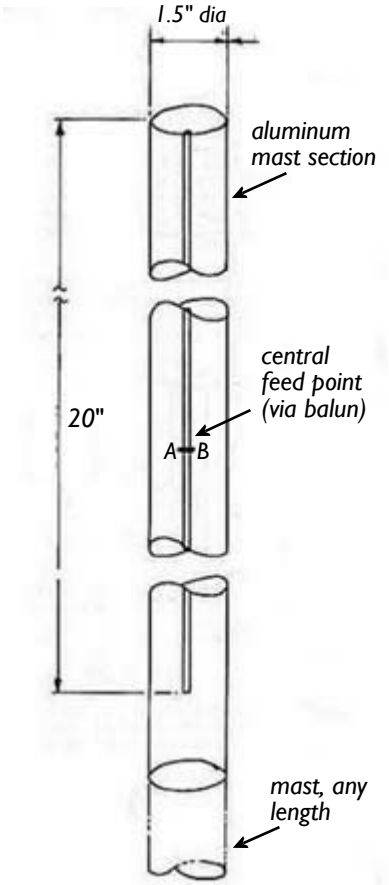


Abe Lincoln mobile antenna for 144 MHz is open at one end (notch antenna).

Alford slot

Slot antennas are widely used in VHF and UHF broadcasting. In a 1946 paper in the Proceedings of the National Electronic Conference, consulting engineer Andrew Alford introduced long slot antennas for the then-new FM band above 80 MHz and the UHF-TV band of 480-920 MHz. A long slot of 2 λ produces a gain of about 5 dBi. The 1946 paper included photos of a long-slot antenna array set up on the Chrysler Building for CBS color TV.

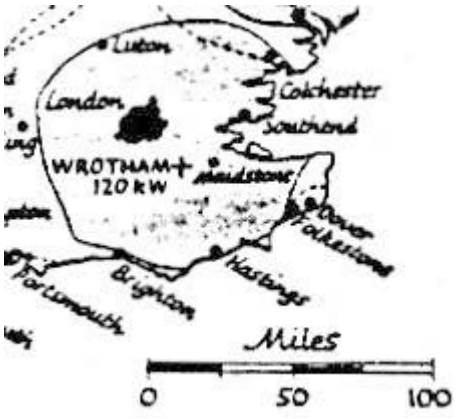
The Alford slot has crossed over into the world of amateur radio. It can be fabricated from standard metal tubing for use on the 1.3 GHz and higher frequency bands, in order to radiate an omnidirectional, horizontally polarized signal. This makes it useful for beacons and TV repeater use. The 1296 MHz design by G3JVL has a slot 2 wavelengths long, with claimed gain of 5-9 dBi. Two antennas can be stacked for higher gain. Some amateurs have even employed this design on 440 MHz.



Alford slot antenna for 1.3 GHz designed by M. Walters, G3JVL. Feed impedance across the 11mm wide slot (A-B) is 200 Ω and requires a 4:1 balun.

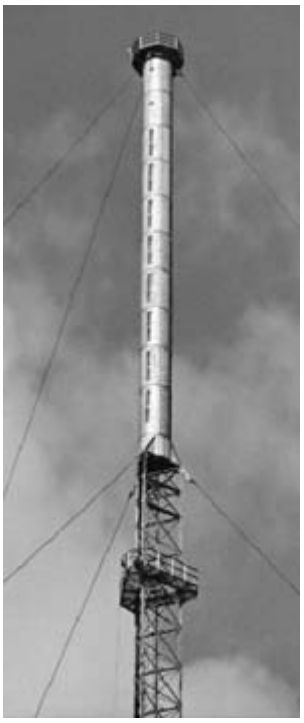
British broadcasting

In the days before battery-portable and car FM radios became popular, VHF sound broadcasts mostly employed **horizontal** polarization. This was to ensure optimum reception by domestic radios equipped with horizontal receiving antennas.



Radio Times *map from 1955 shows range of the BBC Wrotham transmitter.*

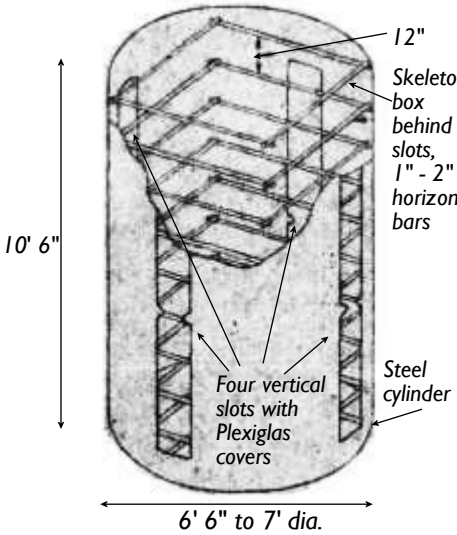
In the U.K. during 1950-52, the BBC carried out tests of VHF sound broadcasting from a 730 ft. hilltop site near Wrotham, Kent, 20 miles southeast of London. (Wrotham is pronounced "root-em"!) The BBC erected a 470 foot mast and used horizontal polarization from an 8-stack slot antenna 400 feet above ground. These tests demonstrated that the site could cover most of southeast England and that FM mode provided much better reception than AM.



Cylindrical section of the Wrotham mast showing eight tiers of vertical slots.

The antenna system employed a 110-ft. long tubular section at the top of the mast. The steel tube was 6' 6" diameter and had 32 **vertical** slots cut into its circumference. The slots were arranged in eight tiers of four, spaced equidistantly around the surface of the mast, in order to provide **omnidirectional** coverage with **horizontal** polarization.

Each slot was sized 8 ft. tall × 1 ft. wide, corresponding to an element size of approximately ¾ λ. Radiating elements were isolated from the inside of the mast using a skeletonized box shape made of metal tubing positioned behind each tier of slots. The slots were covered with an insulating window made of ½" thick Plexiglas® (U.K. name Perspex) in order to provide weather protection and prevent 'organ pipe' sounds when wind was blowing across the mast.

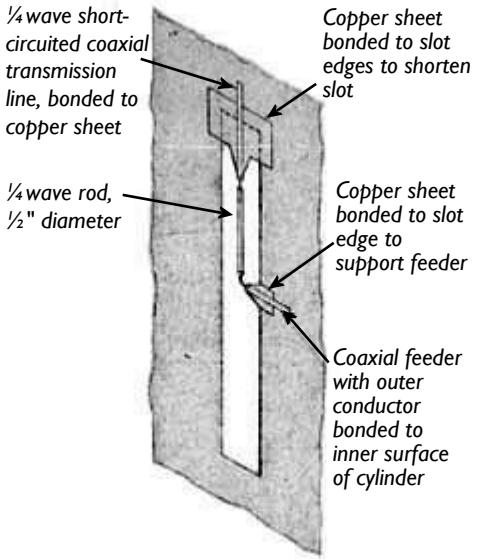


Structure of one tier of the eight-tier slot antenna employed by the BBC at Wrotham.

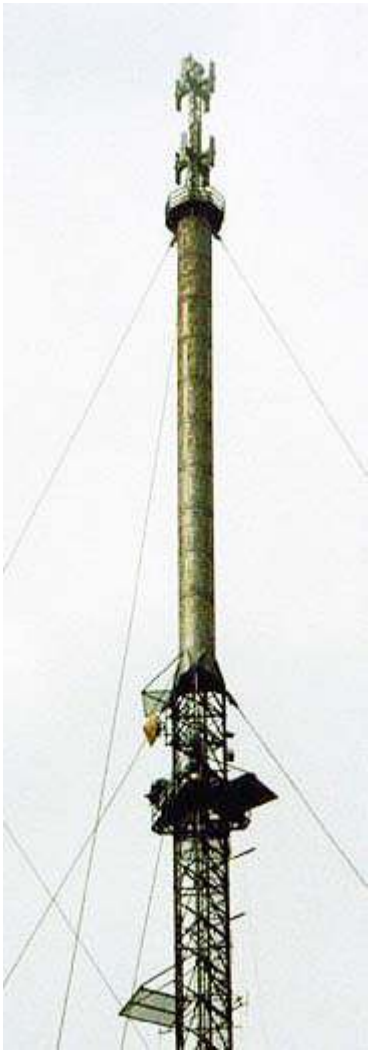
Antenna gain in the horizontal plane was 8 dBd. The antenna system was fed with rigid copper coaxial lines. Each slot was provided with a ¼ λ vertical rod that converted it into a folded slot (complement of a folded dipole), then fed across the gap between slot and rod. The 1 foot slot

width and frequency compensation of the shorted transmission line provided a relatively wide bandwidth of 87.5 to 95 MHz with SWR of less than 1.2:1.

The antenna system tested at Wrotham proved highly successful and was incorporated into the BBC's transmitting stations for low-VHF television, which were expanding across the country in the early 1950s. The only weak point was the rigid coaxial feeder, troubled by movement due to temperature swings — and with ice covering the slots at highly exposed sites.



Coaxial feed arrangement for an individual slot of the Wrotham FM antenna system.



BBC Holme Moss TV and FM mast in 1984. Vertical slots for FM are just visible down the left side of the steel cylinder.

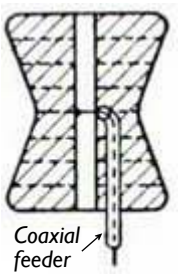
When the official VHF-FM service began from Wrotham in 1955, the BBC transmitted three separate programs – Light Programme, Third Programme and Home Service — on three separate frequencies, 89.1, 91.3 and 93.5 MHz, each with an ERP of 120kW.

My own local BBC FM transmitter was located high in the Pennine Hills at **Holme Moss,** 1750 ft asl. The picture that I took in 1984 shows the FM slot array at the top of the original Holme Moss mast, when it was over thirty years old. (The antennas *above* the FM cylinder are vertical dipoles for Channel 2, 405-line television, switched off in 1985.)

Starting in the early 1980s, the BBC replaced their horizontally-polarized FM antennas with a mixed-polarization design using spearhead crossed dipoles mounted around the outside of the mast. This made a significant improvement to mobile and portable reception using vertical whip antennas.

Skeletons in the closet

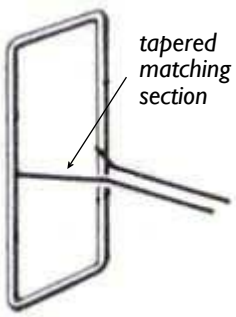
Engineers have tried to reduce the size of slot antennas by taking away as much of the conducting sheet as possible, without affecting the antenna pattern too much. This is sometimes known as 'skeletonizing' the design. One example is the **batwing antenna**, still popular for VHF TV transmission. Metal is removed until only a batwing shape remains around the vertical slot. The slot is then fed in the middle with coaxial cable, resulting in horizontal polarization. Instead of employing a continuous sheet of metal for the wing shape, a grid of tubular metal space bars can be substituted, reducing wind resistance. For omnidirectional coverage, four wings are usually arranged at 90 degree intervals around a vertical mast support. Coaxial feeder is then connected via special jumper between the inner vertical rod of each wing and the vertical mast support. For additional gain, multiple bays can be stacked vertically. According to Jasik (*Antenna Engineering Handbook*), this is a very frequency-tolerant antenna — bandwidth can be 20 percent or more, with a VSWR of better than 1.1:1.



Batwing antenna.

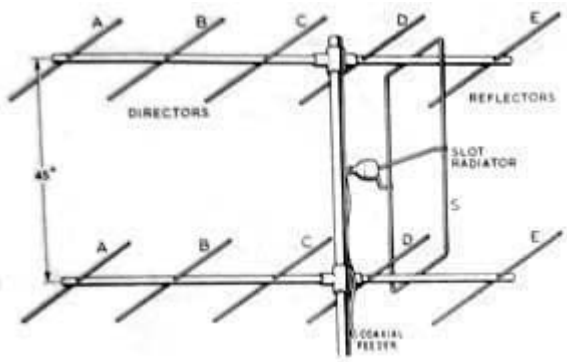
Batwing antenna for VHF TV by Jampro.

Another type of slot antenna was devised by B. Sykes, G2HCG of J-Beam Aerials Ltd. G2HCG was experimenting with a slot feed for use with a Yagi-type array. He removed as much metal as possible from around a conventional slot while retaining satisfactory performance until all that remained was a ½ λ of conducting sheet around the edges of the slot. Further tests showed that if the slot was only surrounded by metal rod bent into a rectangular shape, the performance was still acceptable. This was named a "skeleton slot", fed in the middle of



Skeleton slot developed by G2HCG.

the longer sides through a delta match. When used in a Yagi-type design, *two* rows of parasitic elements are needed, in line with the shorter sections of the bent metal rod. G2HCG described this antenna in the RSGB Bulletin, and it also appears in older RSGB Handbooks. He also used this "double six skeleton slot" design as a high-gain antenna for the high-VHF TV channels.



6-over-6 skeleton slot Yagi array for 145 MHz as depicted in various RSGB publications.

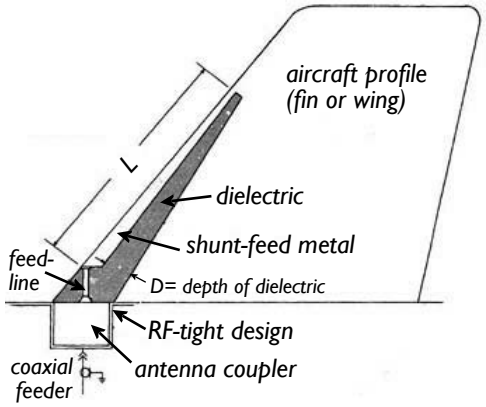
J-Beam manufactured skeleton slot antennas for the 2 meter and 70 cm amateur bands. I have an 8-over-8 skeleton slot antenna for 430 MHz that performed well on horizontally-polarized SSB and CW. Compared with a long Yagi antenna of similar gain, the beamwidth is wider, which is helpful when searching around the band for weak signals. This antenna crossed the Atlantic with me, but unfortunately after various moves, several elements became badly bent.

J-Beam 8-over-8 skeleton slot antenna for 430 MHz suffered several bent elements on its trip across the Atlantic.

Aerospace and military

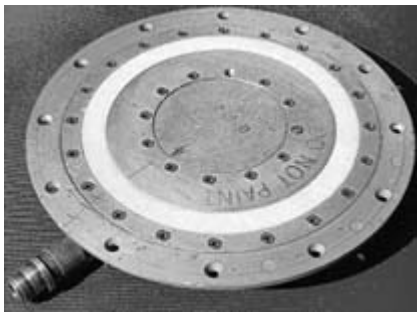
Slot antennas are popular in the aerospace industry for use on high-speed aircraft, missiles and spacecraft. One reason is that a slot cut into the metal surface of a high-speed craft, then smoothly filled with insulating material so it is flush with the body, has a **low-profile** that will not interfere with the aerodynamic properties. This is in contrast to a conventional antenna protruding from the surface of the craft that would cause significant **drag** and be more vulnerable to damage and weather-related effects. Reduced impact from lightning strikes for slot antennas is also a consideration.

One example is the HF "notch antenna" employed on aircraft, which can take the form of an open-ended slot at the base of the tail fin.



Collins notch antenna for HF use on aircraft is shunt-fed across the open end. Dielectric material can be fiberglass.

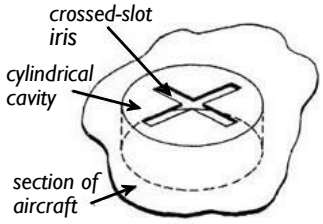
Annular slot antennas are used on aircraft for UHF frequencies as they produce a pattern similar to a vertical dipole.



Annular slot antenna as used on military aircraft.

Another example for aircraft is the cavity-backed slot antenna, equivalent to a pair of crossed dipoles, used for L-band (1535-1660 MHz) satellite communication with circular polarization.

Slot antennas have also been used on military and passenger ships, for example the *Queen Elizabeth 2* had slot antennas for HF in the funnel (smokestack) and on the signal mast for VHF.



Boeing cavity-backed slot antenna for satellite work.

Lateral thinking

Whenever you see a conducting sheet, you may want to **think slot!** A slot could provide a low-profile, stealth antenna. Apple engineers were certainly thinking this way when they introduced slot antennas in the stainless steel body of their iPhone 4.

iPhone 4 antenna slot.

One example of a slot that I considered is a glass window surrounded by a metal frame. Just attach your delta feed across the frame and see where it resonates. If you don't want to drill holes in the frame, use alligator clips for a temporary connection.

Another example might be if your home is clad with aluminum siding. Cut a slot in the siding, feed across the middle of the slot with a delta match and see what you can work.

Perhaps you do not want to mount a large VHF antenna on the outside your vehicle. So why not use the rear window as a slot antenna? And if you have a moon roof, there is another opportunity — just feed across the middle of the longest dimension and see what happens. (Be careful about RF exposure of the occupants if using high power.)

There have been some wilder suggestions for slot antennas. One example, given by John Kraus, W8JK in *Antennas,* is to create a boxed-in slot antenna by digging a large trench in conducting ground then line it with copper sheet or screen. If the dimensions are $\lambda/2$ long by $\lambda/4$ deep, the result will be vertical radiation along the ground, with a maximum at right angles to the slot. If you have a suitable trench handy, this could be an excellent low-profile antenna for the lower-frequency amateur bands.

Dig yourself a trench antenna! Only $\lambda/4$ feet deep...

Another idea is to use salt water as the conducting medium. I remember a suggestion in *Wireless World* where a small, thin island in the middle of the sea could be used as a slot antenna by placing electrodes in the salt water on either side of the island, then feeding with RF energy. This could be a potent antenna for the LF/VLF bands, such as the upcoming 136 kHz or 472 kHz allocations. Do you know anybody with a small island or a promontory sticking out into the ocean?

A small island surrounded by sea water could be fed as a slot antenna...

On a smaller scale, think about other metal shapes that we sometimes have available. How about a shipping container — if you opened the end doors, then fed across the opening, where would it resonate? Or you might have a metal-sided truck available whose rear door could be left open. Perhaps you know a building with a metal roof whose seams are filled with insulating rubber? Think a lot — think slot!

If you do try any of these ideas, be sure to take photographs, measure the antenna properties, log the contacts, then let us know the results.

- NM9J

FM wireless transmitter

An alternative to Bluetooth® **– N2CKD**

I was looking for a quick wireless solution to connect the audio output from some of my home electronic devices such as an Apple iPad, MP3 player, laptop computer or television. Obviously, Bluetooth connectivity is a choice on some newer devices but not on older ones with no Bluetooth capability. Also, Bluetooth technology needs pairing-up of devices and driver programs for each version of a computer operating system. Bluetooth also has audio/video receive latency limitations. New versions of Bluetooth technology are constantly appearing, the latest is version 4.2.

An *alternative wireless solution* to Bluetooth is the use of a low-power personal Wireless FM Transmitter operating in the 88 - 108 MHz band.

What is Bluetooth?

Bluetooth is a wireless technology standard intended to replace wire cables when exchanging data over short distances between fixed and mobile devices, using frequencies in the 2.4 - 2.485 GHz ISM band.

Bluetooth wireless headset.

A popular application of Bluetooth technology is for wireless audio connectivity, for example transfer of audio signals between a mobile phone and a headset or for hands-free mobile phone use in a moving vehicle. The same approach can connect a mobile phone that is streaming Internet audio to a set of wireless speakers or to stereo headphones.

Bluetooth wireless stereo speakers.

A Bluetooth-enabled product, such as a headset or wristband/watch, contains a tiny computer chip with Bluetooth radio and software. When two Bluetooth devices want to talk to each other, they need to be *'paired'*. Communication between Bluetooth devices takes place over a short-range network known as a piconet. This can connect from two to eight devices wirelessly.

There are now a great many *Bluetooth-enabled* devices on the market, including mobile phones, car entertainment systems, computers, televisions, game consoles, headsets, microphones and IoT (Internet of Things) devices.

So why am I writing this article?

Well, many of us do **not** have Bluetooth capability in our home devices and would have to purchase an adapter or dongle for each older device to enable Bluetooth. You might have to purchase several adapters for different devices. Bluetooth adapters range in price from $9.00 to $199.00 depending on function, version, and whether they use a 3.5mm jack or a USB connection.

Bluetooth USB dongle.

Most likely you would like to stream music, or other stereo audio from an iPhone, iPod, iPad, laptop or tablet computer to a Bluetooth-enabled wireless speaker. If so, you could also stream the same music by using a personal FM wireless transmitter to any nearby broadcast-FM receiver.

Wireless FM transmitter

A personal wireless FM transmitter is a low-power modulator/TX that broadcasts the output signal from a portable audio device such as an MP3 player to a standard FM band radio receiver. The transmitter plugs into the device's headphone /speaker jack and then broadcasts the audio signal on a broadcast band FM frequency, which can be picked up by any FM radio receiver at home or in the car. This allows portable audio devices to gain the louder and better sound quality of a home FM or car receiver wirelessly. These small transmitters are more often used in vehicles than at home.

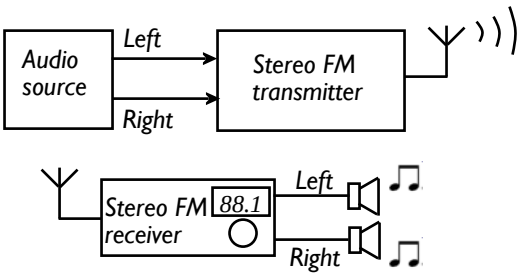


Diagram shows a low-power FM transmitter being used to couple the output from an audio device to a nearby stereo FM receiver.

I purchased an "iWorld" Wireless FM Transmitter for $5.00 from the local 'Five Below' store, but they are also available from Big Lots as "iHome" and "iFlavor" brands. The unit is powered by two AAA batteries or by an included 12 volt car adapter. It transmits on five fixed channels — 88.1, 88.3, 88.5, 88.7 or 88.9 MHz FM. The unit has a standard 3.5 mm (⅛") stereo adapter plug on a short cable to connect to an external speaker/ headphone jack.

'iWorld' wireless FM transmitter available from the 'Five Below" store for $5.00.

I unscrewed the transmitter unit to see if there was any way to lengthen the internal antenna for longer distance reception or to modify it for another frequency, while still complying with the FCC rules — but it has tiny components on a soldered SMT board, so modification is not feasible.

Close-up of Lovji's iWorld Wireless FM Transmitter. [N2CKD pic.]

[In the USA, Part 15 of the FCC rules specifies that field strength of unlicensed low power FM transmitters, operating in the 88-108 MHz broadcast band, shall not exceed 250 microvolts/meter, measured at a distance of 3 meters. This corresponds to an output power of ~0.01 microwatts, good for a range up to ~200 feet .]

I plugged the low-cost FM transmitter into my iPad, into an MP3 player and into my 2 meter FM dual-band HT which also has FM broadcast band capability. I turned on the 'iWorld" FM transmitter then tuned the domestic FM receivers to a frequency in the range 88.1-88.9 MHz. As expected, I could hear the streaming speech and music loud and clear, compared to the low, tinny sound from my iPad's small internal speakers. I could also hear the same streaming data on several other FM receivers 'simultaneously' around the house and as far away as my mailbox using a portable FM receiver. The transmission is crisp and clear with good fidelity from the FM receiver's large speakers. I regularly use it to listen to Internet music, news and YouTube videos while using my iPad. You can even connect to a TV and listen to the TV audio on a nearby FM receiver at your choice of volume.

Personal FM transmitter sends audio from a 2 meter HT to the larger speakers of a nearby FM receiver. [N2CKD pic.]

Unit sends TV audio to larger speakers of an FM stereo RX.

Now, instead of a Bluetooth speaker you can listen to your por-

table devices via FM Radio on a frequency of 88.1-88.9 MHz for less than 5 bucks. The unit needs no software or pairing, it's portable and compatible with any FM Radio. I suggest you give it a try next time you are listening to your TV late at night or browsing the Internet and listening to Internet music — which you can then re-transmit to your home FM receiver.

- 73 de Lovji, N2CKD

*[Low power FM transmitters as described by Lovji are always worth a try. For example, a suitable unit is already incorporated into most SiriusXM satellite receivers for in-car use. Personal FM transmitters are very convenient when you have a broadcast FM receiver nearby and you can find a clear frequency to use. But my own experience is that **direct** connection to the AUX input jack of the audio equipment will always be superior in terms of audio quality, signal to noise ratio and stereo separation — though not as convenient. All you need is a short patch cable with suitable connectors at each end. – Ed.]*

National Parks on the Air update - KD2IRA

On Memorial Day weekend, May 28-29, 2016, KD2IRA conducted his second National Parks on the Air ("NPOTA") activation, this time at the Washington-Rochambeau Revolutionary Route National Historic Trail. The activation was at **Old Saint Peter's Church** on Locust Avenue at Oregon Road, in Cortlandt Manor. In 1780-1782 the structure was used as the French military hospital for Rochambeau's troops returning from their victory at Yorktown, Virginia. Several French troops are buried there, and George Washington is reported to have spoken there. With an able assist from YL Stefani, KD2IRA operated 40 meter and 20 meter SSB on Saturday May 28, logging 106 QSOs. This included several PCARA contacts — thanks to NM9J Malcolm, KD2ITZ Lou and N2CKD Lovji. Antenna problems prevented operation on Sunday.

Antenna at Old St Peter's. [KD2IRA pic]

David KD2IRA activates the NPOTA station on trail TR23 at Old St Peter's Church in Cortlandt Manor. [KD2IRA pic.]

Our next planned activation for NPOTA occurs on Thursday July 7, 3:00-7:00 p.m. and Thursday July 14, 2016, 2:00 to 5:00 p.m. local time, at **Saint Paul's Church** in Mount Vernon — also a site approved for NPOTA activation. According to NPOTA statistics published on the ARRL web site, that location is one of the rarest in the entire NPOTA network, having had only two activations to date, yielding 62 QSOs. We are expecting quite a pile-up! This was a difficult site to obtain a permit, and hours were very limited.

Future activations are planned for Roosevelt-Campobello International Park on the Maine-Canada border and Assateague National Seashore in Maryland. Campobello is also one of the rarest NPOTA sites. We are looking forward to hoisting a kite-supported antenna at one of these sites. As always, we operate entirely on battery and solar power. - 73 de David, KD2IRA

Late news

In 2015 PCARA acquired a Yaesu Fusion DR-1X 144/440 MHz C4FM repeater. The unit was on test for a time last year — see *PCARA Update,* Oct 2015, p 16.

DR-1X repeater [N2CBH pic.]

On June 28th, Bob N2CBH and Joe WA2MCR brought the DR-1X **back on-air** using the call sign and frequency of N2CBH/R. If you already have Bob's UHF repeater settings stored in memory, you are ready to go. Otherwise, program your radio for **448.725** MHz, **-5.0** MHz offset, **107.2** Hz PL tone.

The DR-1X is set-up for "Automatic Mode Select" (AMS) to detect whether the incoming signal is analog FM or digital C4FM, with "Fix" output to transmit analog FM in both cases. There is *no* courtesy tone.

Peekskill / Cortlandt Amateur Radio Association

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Archive: http://home.lanline.com/~pcara/newslett.htm

PCARA Information

PCARA is a **Non-Profit Community Service Organization**. PCARA meetings take place the first Sunday of each month* at 3:00 p.m. in Dining Room B of NewYork-Presbyterian/Hudson Valley Hospital, Rt. 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. *Apart from holidays and July/August break.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz
KB2CQE: 449.925MHz -5.0, PL 179.9Hz
N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

(**Summer break** — no meetings in July, August.)
Sun Sept 11: PCARA Meeting, Hudson Valley Hospital, 3:00 p.m.

Hamfests

Sun Jul 17: Sussex Co ARC Hamfest, Sussex Co Showgrounds, 37 Plains Rd, Augusta NJ. 8:00 a.m.
Sat Aug 20: Ramapo Mountain ARC Hamfest, St. Catherine RC Church, 112 Erskine Rd, Ringwood NJ. 8:00 a.m.
Sun Aug 28: Candlewood ARA Western CT Hamfest, Edmond Town Hall, 45 Main St., Newtown CT. 8:00 a.m.

VE Test Sessions

Jul 2, 9, 16, 23, 30: Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk, NY. 12:00. Pre-reg M. Rapp, (914) 907-6482.
Jul 14: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.
Jul 15: Orange County ARC, Munger Cottage, 183 Main Street, Cornwall NY. 6:00 p.m. Joseph DeLorenzo (845) 534-3146.
Jul 18: Columbia Univ VE Team ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm, Alan Crosswell (212) 854-3754.

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